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May 1, 1996

Ms. Ann Merwarth
Manager, HST Operations & Ground Systems Project
Goddard Space Flight Center - Code 441
Greenbelt, MD 20771

RE: HST VISION 2000 Program Review Panel Report

Dear Ann,

Attached is the report from the HST VISION 2000 Program Peer Review Panel. The Panel hopes that the inputs to you and the HST Team are helpful.

I have distributed the report to those listed below and have left the internal Project distribution for your office.

Sincerely,

Gael F. Squibb
Manager, NASA Data Services

Distribution
Preston Burch

Review Board

Roger Brissenden SAO
Alan Johns GSFC
David Kaslow Lockheed / Martin
Marvin LeBlanc JSC (Not Present)
George Morrow GSFC (Not present for Panel Discussions)
Ethan Schreier STScI (Not Present)
Steve Tompkins GSFC (Not Present)

HST VISION 2000 PROGRAM

REVIEW PANEL REPORT

DESIGN CONFIRMATION REVIEW

April 30 – May 2, 1996

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Gael F. Squibb
Chairman

May 2, 1996

Review Panel Members Present at the Design Confirmation Review

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Roger Brissenden -- SAO

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Dave Kaslow -- Lockheed Martin

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Alan Johns GSFC

HST VISION 2000 DESIGN CONFIRMATION REVIEW April 30 - May 2, 1996

The Vision 2000 (V2K) review was held at GSFC during the period April 30 through May 2, 1996. The purpose of the review was for the Review Panel to validate the Vision 2000 design and to make comments to the HST O&GS Project Manager that will aid the Project in achieving the Vision presented. The Panel wishes to thank the presenters for the clarity and openness of the presentations that have enabled us to make comments that we hope will be helpful.

GENERAL

The Review Panel is pleased with the responsiveness to the October 1995 Review. All of the comments and observations were either answered or implemented.

The overall impression of the Review Panel is positive and we congratulate the project on the achievements since the last review. The presenters were knowledgeable, showed ownership of the systems they represented, and the Panel observed that no question caught them off guard. The focus on customer needs by the presenters was good.

The Review Panel observes that the project did an excellent job of developing an integrated schedule and showing flowdown to the PDT's. Continued focus on the relationship between the PDT outputs and the integrated schedule will be essential to the success of the project. The Vision 2000 Manager will need additional staff, as indicated (e.g. Integration Manager), and we would endorse immediate attention to this effort.

Progress of PDT's was good and appeared to be on schedule. However, the Panel is concerned that there was not any presentation or discussion which allows the Panel to understand or draw any conclusions relative to the size of the development tasks, the resources available and the viability of the schedule. **The schedules should show the relationship between delivered elements and the details of the planned workforce reductions on a yearly or quarterly basis. The lower level schedules for CCS appeared to be missing. Developing these schedules and sharing them with the rest of Vision 2000 is required** Realizing that this panel is not reviewing resources, we feel that it would be in the projects interest to demonstrate the viability of the tasks and schedules presented.

The Panel observes that the System Architecture Board is working and making a positive contribution to the V2K.

A V2K Status Review, with emphasis on CCS Design, would have been a more appropriate name for this review since the full detailed design was not presented. Since the purpose of this Panel is not to make comments relative to detailed design, **we suggest that at the next review, a presentation regarding the design reviews that have been held and the top level results be provided**

Risk Management has not yet been put in place. **The project should understand how they are going to get caught up, so that they understand the risks associated with the development of the January 97 system.**

The Panel believes that more detailed metrics must be established for monitoring the development process. This was mentioned in the Vision 2K Operations Concept (see paragraph C.5.6), but not brought up in these presentations.

We conclude that the Vision 2000 concept is valid.

CONTROL CENTER SYSTEM

The Panel observes that the Technical Architecture is sound and noted similarities to the JSC - MMC, the EOS -FOS, and the MSFC - EHS architectures.

The Panel is concerned about requirements traceability. The number of staff that were involved with the legacy code is an important factor, but it is essential that there is a process to ensure that each requirement is addressed and tested. **We would like to see a demo of the engineering repository in about 9 months and a methodology of ensuring that requirements are well defined, and traced.**

At the previous review it was not clear how much of a move away from VMS was possible. It appears at this review, that there will be only a small amount of VMS code left. **The Panel recommends that the Project seriously consider expending the effort to totally eliminate all of VMS within CCS.**

The relationship between the PRDWG, the PDTs and the capturing of the top level design is unclear to the Panel. The Panel is concerned that the CCS DPT is developing a detailed design prior to the completion of the requirements analysis and functional design. It was unclear what the approval process is for baselining the logical and physical data design It was also unclear what are the criteria for design maturity at various phases of development and associated metrics. **The Panel recommends that the CCS PDT develop a process for the iteration of the design as the system matures. The CCS DPT should also define how the design is represented in the repository and communicated to the developers. In defining this process, the project must ensure a close relationship with the STScI.**

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The Panel is unclear about the relationship of the TDA to system modeling. **The V2K Project should develop and communicate to the PDTs what the inputs to system modeling are and how they feedback to the system design process.**

The Panel feels that the CCS PDT should give more thought to their approach to operating system upgrades. The TPOCC schedules upgrades no earlier than 6 months after an initial release, allowing for testing and time for vendor bugs to be fixed by the vendor.

A plan needs to be developed for evaluating and incorporating new COTS products and COTS upgrades. The Panel observes that the initial percentage of COTS to new code looks reasonable. The Project should understand the dependencies that COTS have on each other and with the rest of the system. COTS will become a non trivial maintenance and testing issue. **The Project should develop a dependency matrix showing the relationship between the COTS products and the rest of the system and also ensure that license renewals have been accounted for in the resource estimates.**

The choice of JAVA for the GUI is a decision to use a state of the art programming language, but **the project should ascertain the risk involved in hiring JAVA programmers. The Project should also consider layering a common GUI on top of the diverse COTS and GOTS.**

The presenters addressed the problem of aging of information and we suggest keeping focused on this. **The Project should develop some metrics so that there is management insight into this key area.**

The Panel observes that the response to our issues about security is solid. However, the Panel has some concern that the Project has underestimated the steps needed to implement such a secure system. **We recommend the Project develops a security validation approach.**

It is not clear what criteria are being used for determining what CCS data will be DBMS or flat file. Further, it is not clear what data is to be stored on-line and off-line. This decision needs to be made now since it will be a cost driver.

PLANNING & SCHEDULING SYSTEM

The Panel congratulates the P&S PDT on the time line generation reductions. The test and integration test cycle reductions were also impressive.

The Panel is concerned that the staffing level goals for the mission planning system (20 in operations and 25 for development) seems high. The Project should develop a scenario that supports this level of staffing, and identify the assumed level of development and the development drivers.

SCIENCE DATA PROCESSING

The Panel observes that this area continues to be the furthest along and we have no concerns for this PDT.

SSM FLIGHT SOFTWARE DEVELOPMENT

The Panel was pleased with the requirements traceability approach and status. The interface between the Flight S/W and the CCS PDT should be strengthened. The Panel observes that the Flight S/W and the CCS coming together are key to V2K success. **The Project should review and determine that the schedules and testing periods are correct to ensure that the two PDT's are correctly phased.** The Panel is concerned that small slips to the CCS, with the needed rigidity of Flight S/W could get the two processes out of sync.

FUTURE REVIEWS

The Review Panel would suggest that the next review be held in about 9 months, around November 1996. The focus of this review would be on the management and requirements issues that were raised above. If it is feasible to have a review at this time the Review Panel would like to see the following items addressed:

- Requirements Tracability - including a demonstration of the Engineering Repository and its use by management, developers, and testers.
- Overall status on progress
- CCS Detailed Status including error detection and failover capabilities.
- Risk Management
- Security Implementation and Design
- Dependency Matrix for COTS
- Schedule, Development Resources to a level of detail one step lower than that presented at this review, including the staffing levels associated with the PDT deliveries.
- System Modeling and Performance Requirements

The following review could then be just prior to the V3 delivery